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IS 4810 (1968): Fumigation Sheets and Covers, Rubberized
[PCD 13: Rubber and Rubber Products]

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Indian Standard

SPECIFICATION FOR FUMIGATION SHEETS AND COVERS, RUBBERIZED

(Third Reprint DECEMBER 1988)

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 4

July 1969

AMENDMENT NO. 3 JULY 1989

TO

IS : 4810 - 1968 SPECIFICATION FOR FUMIGATION SHEETS AND COVERS, RUBBERIZED

(*Page* 5, *clause* **4.4.4**) — Substitute the following for the existing clause:

'**4.4.4** *Workmanship and Finish* — The proofing shall be smoothly and uniformly spread between the two cloth layers and on one surface of the double-texture fabric. The cloth layers in the finished fabric shall be firmly adhered to the proofing. The selvedges of the base cloth shall coincide and be uniform throughout the length. It shall be flexible and free from blisters, wrinkles, unproofed areas and pinholes. It shall be waterproof.'

[*Clauses* **4.1** (*line* 5), **4.3.1** (*last line* 9 (*line* 3), *and* **4.5.1** (*line* 3)] — Delete the reference of 'alumini h'.

(*Page* 6, *clause* **4.4.9**) — Insert the follo w clause after **4.4.9**:

'**4.4.10** *Fumigant Retention Test* — The lo hosphine in 24 h shall t be more than 15 percent when determin in accordance with the thod prescribed in Appendix D.'

(*Page* 13, *clause* **C-2.3.2.2**) — Insert the following new Appendix ter **C-2.3.2.2**:

'APPEND D

(*Clause* 4

DETERMINATION OF FUMIGA NTION PROPERTY

D-1. QUALITY OF REAGENTS

D-1.1 Unless specified otherwise, pu hemicals and distilled water IS : 1070 - 1977*) shall be used in ts.

NOTE - 'Pure chemicals' shall mean ch icals that do not contain impurities hich affect the results of analysis.

D . APPARATUS

D-2.1 Gas-Tight Syringe — 100-ml capacity.

D-2.2 Aspirator Bottle — 5-litre capacity bottle fitted with three-way stopcock.

---

*Specification for water, for general laboratory use (*second revision*).

D-2.3 Petri Dish

D-2.4 Burette — 50-ml capacity.

D-2.5 Pipette — 10-ml capacity.

D-2.6 Exposure Cell — A specially designed stainless steel cell comprising of two cylindrical chambers having cross section area 100 cm^2 and 10 cm height which may be coupled without leakage with the help of a silicone rubber seal (*see* Fig. 1). The test fabric is sandwiched between these two chambers and tightened with nuts and bolts. Both the cells shall have in and out vents controlled through precision needle valves for introduction and withdrawal of air for analysis.

D-3. REAGENTS

D-3.1 Aluminium Phosphide Tablet — Each tablet weighing approximately 3 g and containing minimum 56 percent (*m/m*) active ingredients.

D-3.2 Mercuric Chloride Solution — 10 percent (*m/v*) solution of mercuric chloride in water.

D-3.3 Standard Iodine Solution — 0·1 N iodine solution. Dissolve 12·7 g of iodine in water containing 30 g of potassium iodide and make up the volume to 1 litre in volumetric flask.

D-3.4 Standard Sodium Thiosulphate Solution — 0·1 N sodium thiosulphate solution. Dissolve 24·8 g of sodium thiosulphate crystals ($Na_2S_2O_3 \cdot 5H_2O$) in water and make up the volume to 1 litre in volumetric flask.

D-3.5 Starch Indicator Solution — Make a paste of 1 g of soluble starch with a little water. The paste is then added to 100 ml of boiling water with constant stirring. The resulting solution is boiled for another minute and then cooled.

D-4. STANDARD ATMOSPHERIC CONDITIONS FOR TESTING

D-4.1 Test shall be carried out in an atmosphere of 65 ± 5 percent relative humidity and at a temperature of 27 ± 2°C.

D-5. PROCEDURE

D-5.1 Estimation of Phosphine Concentration in Aspirator Bottle — Two to three aluminium phosphide tablets are kept in aspirator bottle. The bottle is made air-tight and filled with air having relative humidity more than 60 percent. After the equilibration period of 24 h, 50 ml phosphine laden air is drawn from this bottle through a three-way stopcock into a gas-tight syringe and then slowly bubbled into 20 ml of 10 percent mercuric chloride solution. The precipitate formed is filtered, washed and then dissolved in 10 ml of 0·1 N iodine solution. Titrate this iodine solution against standard sodium thiosulphate solution using starch solution as indicator.

D-5.1.1 Carry out a blank by using all reagents in the same quantities except phosphine gas.

D-5.1.2 *Calculation* — Calculate the concentration of phosphine in enclosed space of aspirator bottle as follows:

$$\text{Phosphine, mg/l } (c) = \frac{0{\cdot}425 \times V \times N \times 1\,000}{0{\cdot}1 \times 50}$$

where

V = final volume of standard sodium thiosulphate solution in ml, used for titration of iodine solution, after correction for blank; and

N = normality of standard sodium thiosulphate solution.

D-5.1.2.1 Estimate the volume of phosphine required to produce a concentration of 3 mg/l in the upper chamber of apparatus as follows:

$$\text{Volume of phosphine required (ml)} = \frac{1\,000 \times 3}{c}$$

where

c = concentration of phosphine in mg/l (*see* **5.1.2**).

D-5.2 Estimation of Escaped Phosphine — 15 ml of 10 percent mercuric chloride solution is kept in a wide petri dish in the lower chamber. The test fabric is fitted in between the two chambers which are clamped tightly. The fabric shall be properly and uniformly stretched between the two chambers. The upper chamber is partially evacuated by the gas-tight syringe and required volume of air containing phosphine to produce 3 mg/l concentration, as calculated in **D-5.1.2.1**, is introduced into it. After 24 h of exposure the test chambers are opened and the amount of phosphine permeated in the lower chamber (which forms precipitate with mercuric chloride solution kept in petri dish) is estimated following the procedure of dissolving precipitate in iodine solution and titrating it against standard sodium thiosulphate solution as given in **D-5.1**.

D-5.2.1 Carry out a blank by using all reagents in the same quantities except phosphine gas.

D-5.2.2 *Calculation* — Calculate the concentration of phosphine (mg) permeated in the lower chamber in 24 h as follows:

$$\text{Concentration of phosphine, mg (} Z \text{)} = \frac{0{\cdot}425 \times V \times N}{0{\cdot}1}$$

where

V = final volume of standard sodium thiosulphate solution in ml, used for titration of iodine solution after correction for blank; and

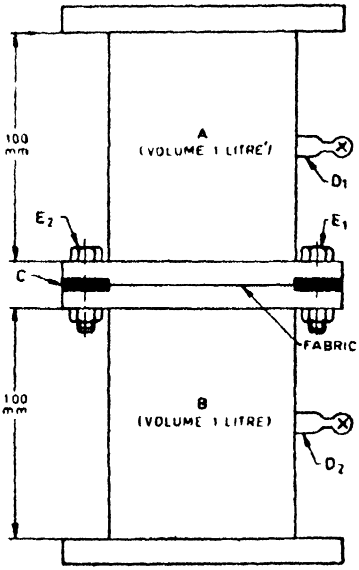
N = normality of standard sodium thiosulphate solution.

D-5.2.2.1 Calculate the percentage escaped phosphine in 24 h as follows:

$$\text{Escaped phosphine, percent} = \frac{Z \times 100}{3}$$

where

Z = concentration of phosphine, in mg, permeated in lower chamber (*see* **5.2.2**).



A and B = Stainless steel chambers
C = Silicone rubber seal
D_1, D_2 = Inlets for fumigants
E_1 and E_2 = Clamping nuts and bolts

FIG. 1 APPARATUS FOR CHECKING RETENTION OF FUMIGANTS

(PCDC 16)

Printed at Printwell Printers, Delhi, India

Indian Standard

SPECIFICATION FOR FUMIGATION SHEETS AND COVERS, RUBBERIZED

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(*Continued on page 2*)

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(*Continued from page* 1)

Panel for Fumigation Covers, CETDC 3 : P4

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Indian Standard

SPECIFICATION FOR FUMIGATION SHEETS AND COVERS, RUBBERIZED

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 3 August 1968, after the draft finalized by the Treated Fabrics Sectional Committee had been approved by the Chemical Division Council, Mechanical Engineering Division Council and Textile Division Council.

0.2 Gas-proof covers are used to fumigate food grains, either in the open or in godowns. Even in gas-tight godowns, individual stocks may be economically treated in these covers. Fumigation of large stocks in a fumigation chamber involves too much time and labour because the stocks have to be moved to and fro. Sometimes infested stock needs to be fumigated miles away from a fumigatorium and gas-proof covers are the only economical and convenient means of getting this done. This Indian Standard prescribes requirements for sheets needed to make such covers and also includes instructions to guide manufacturers in making suitable gas-tight covers and in using them properly.

0.3 The Committee intends to incorporate a suitable requirement for permeability of the fumigation cover materials to fumigants later when a simple method for testing permeability becomes available for routine use.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for rubberized fumigation sheets and covers.

2. TERMINOLOGY

2.1 For the purpose of this standard, definitions given in IS : 2244-1965† shall apply.

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*Rules for rounding off numerical values (*revised*).

†Glossary of terms relating to treated fabrics. (Since revised).

AMENDMENT NO. 2 AUGUST 1986

TO

IS:4810-1968 SPECIFICATION FOR FUMIGATION SHEETS AND COVERS, RUBBERIZED

[*Page 4, Table 1, Sl No.* (i), *col 3*] - Substitute '120^{+5}_{-2}' *for* '120'.

(*Page 5, clause 4.3.1.1*) - Substitute the following for the existing clause:

"4.3.1.1 The rubber polymer content shall be determined by indirect method as prescribed in Appendix A of IS:6110-1983 'Specification for double-texture rubberized waterproof fabrics'."

(PCDC 16)

Reprography Unit, BIS, New Delhi, India

3. CONDITIONING OF THE TEST SPECIMENS

3.1 Specimens selected for test shall be conditioned at a temperature of 27 ± 2°C and at relative humidity 65 ± 2 percent for at least 48 hours before test.

4. REQUIREMENTS

4.1 Fumigation covers shall be made from fumigation sheets fabrics and shall conform to the requirements of **4.5**. The fumigation sheets shall have a layer of rubber proofing between two plies and a layer of rubber proofing on the outer surface of one of the plies. The outer layer of rubber proofing shall have a lustrous aluminium finish. The base fabric, the rubber proofing and the rubber proofing and fumigation sheet (finished fabric) shall conform to the requirements of **4.2**, **4.3** and **4.4** respectively.

4.2 Base Fabric

4.2.1 The base fabric shall be of white cotton. It shall conform to the requirements given in Table 1.

TABLE 1 REQUIREMENTS FOR BASE FABRIC

SL No.	CHARACTERISTIC	REQUIREMENTS FOR BASE FABRIC	METHOD OF TEST, REF TO IS No.
(1)	(2)	(3)	(4)
i)	Weight of fabric, g/m²	120	IS : 1964-1961*
ii)	Ends per dm, *Min*	270	IS : 1963-1961†
iii)	Picks per dm, *Min*	220	do
iv)	Breaking strength, kg/cm width, *Min*:		IS : 1969-1961‡
	warp-way	6·8	
	weft-way	4·5	

*Methods for determination of weight per square metre and weight per linear metre of fabrics. (Since revised).

†Method for determination of ends and picks per unit length in woven fabrics. (Since revised).

‡Method for determination of breaking load and elongation at break of woven fabric (by constant-rate-of-traverse machine). (Since revised).

4.3 Proofing

4.3.1 The proofing of both the outer layer and the intervening layer between the base fabrics shall consist of vulcanized rubber composition, prepared from high grade natural and/or synthetic rubber and shall be so compounded as to ensure good ageing properties. It shall have a rubber polymer content of not less than 40 percent by weight and shall be free from vulcanized waste, reclaimed rubber, rubber substitutes and from substances liable to cause tendering of the fabric. It shall be reasonably free from substances known to have deleterious action on rubber, such as copper and manganese compounds. It shall be non-irritant and free from objectionable odour. The proofing used in the outer layer shall be provided with a lustrous aluminium finish.

4.3.1.1 The rubber polymer content shall be determined by either a direct or an indirect method as mutually agreed to between the purchaser and the supplier.

4.4 Fumigation Sheet (Finished Fabric)

4.4.1 *Dimensions* — The length and width of the fumigation sheet shall be as agreed to between the purchaser and the supplier. There shall, however, be not more than one joint in the bottom layer.

4.4.2 *Weight* — The maximum weight of the fumigation sheet shall be 625 g/m^2 when tested by the method prescribed in IS : 1964-1961*.

4.4.3 *Breaking Strength* — The breaking strength of the fumigation sheet in warp direction shall be not less than 13·5 kg/cm when tested in accordance with IS : 1969-1961†.

4.4.4 *Workmanship and Finish* — The proofing shall be smoothly and uniformly spread between the two cloth layers and on one surface of the double-texture fabric. The cloth layers in the finished fabric shall be firmly adhered to the proofing and the aluminium finish provided on the outer side of the fabric, shall be even and lustrous. Aluminium finish shall be fast to rubbing. The selvedges of the base cloth shall coincide and be uniform throughout the length. It shall be flexible and free from blisters, wrinkles, unproofed areas and pinholes. It shall be waterproof.

4.4.5 *Proofing Content* — The proofing content shall be not less than 300 g/m^2 of which not less than 70 percent shall be in the sandwich layer. The proofing content shall be determined in accordance with the method given in Appendix A.

4.4.6 *Adhesion Between Fabric Plies* — Fabric plies of a strip of the fumigation sheet fabric, 2·5 cm wide, shall not separate at a rate exceeding 2·5 cm per minute under a load of 1·8 kg, when tested in accordance with the method B prescribed in IS : 3400 (Part V)-1965‡.

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*Methods for determination of weight per square metre and weight per linear metre of fabrics. (Since revised).

†Method for determination of breaking load and elongation at break of woven fabric (by constant-rate-of-traverse machine). (Since revised).

‡Methods of test for vulcanized rubbers: Part V Adhesion of rubbers to textile fabrics.

4.4.6.1 After being subjected to the accelerated ageing test as specified in **4.4.8** and then conditioned at a relative humidity of 65 ± 2 percent and temperature of 27 ± 2°C for 48 hours, the plies of a 2·5 cm wide strip of fumigation sheet shall not separate at a rate exceeding 2·5 cm per minute under a load of 1·4 kg.

4.4.6.2 After being immersed in the fumigant of the composition specified in **4.4.7** for 24 hours at a temperature of 27 ± 2°C and then conditioned in an atmosphere maintained at a relative humidity of 65 ± 2 percent and temperature of 27 ± 2°C for 48 hours, the plies of a 2·5 cm wide strip of fumigation sheet shall not separate at a rate exceeding 2·5 cm per minute under a load of 1·1 kg

4.4.7 *Resistance to Fumigant* — The loss in weight of the sample or immersion in a fumigant consisting of three parts of ethylene dichloride and one part of carbon tetrachloride for 72 hours at 27 ± 2°C shall be not more than 4 percent as calculated on the original weight of proofing. Both the weights of samples before and after immersion in the fumigant shall be determined after conditioning the sample at 65 ± 2 relative humidity and at 27 ± 2°C for at least 48 hours.

4.4.8 *Accelerated Ageing Test* — The sample shall show no apparent deterioration, when tested in accordance with the method given under clause **4.3** of IS : 3400 (Part IV)-1965* at a temperature of 90 ± 1°C for 120 hours.

4.4.9 *Waterproofness Test* — A 20-cm diameter piece of the sample cloth when subjected to a 90-cm head of water for one hour on the aluminium finished face, shall not allow water to percolate through and not become wet on its outer surface.

4.5 Construction of Fumigation Covers

4.5.1 *Design and Size* — The fumigation cover shall have a mosquito net-like structure. It shall be made by stitching together pieces of fumigation sheets of appropriate dimensions, with the aluminium finish on the outside. It shall have one or more openings at the top, each fitted with a tubular funnel made from a piece of fumigation sheet and provided with tying tapes for closing. It shall also be provided with a number of handling strips at the top and bottom. The size of the cover and the number of openings at the top and other details of design shall be as agreed to between the purchaser and the supplier.

4.5.2 *Stitching* — The stitching shall be done neatly by means of 6/36s sewing cotton thread (variety No. 15 of IS : 1720-1960†) or other approved thread having a breaking strength of not less than 2·25 kg. The joints shall be of the type shown in the sketch in Appendix B, stitched by means of two rows of parallel stitches about 2·5 cm apart. The number of stitches shall be about 25 to 30 per decimetre.

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*Methods of test for vulcanized rubbers: Part IV Accelerated ageing.

†Specification for cotton sewing thread, bleached or dyed. (Since revised).

4.5.3 *Sealing the Stitched Joints* — All the stitches shall be adequately covered by means of a self-vulcanizing rubber solution or other approved sealing material or by taping with rubberized fabric by means of a self-vulcanizing rubber solution so as to ensure that the stitched portions are leakproof.

4.5.4 Details of fabrication of a suitable fumigation cover are given in Appendix B for guidance of the supplier.

5. PACKING AND MARKING

5.1 The covers and sheets shall be freely dusted with french chalk on the rubber side and shall be suitably folded or rolled. Each cover shall be tied at two places to form a bundle which shall be wrapped with one layer of kraft paper followed by a layer of waterproof packing paper and finally an outer layer of heavy jute hessian. The bundles shall be packed into bales without pressure. The seams of the bale shall be securely sewn with double jute twine with not less than 12 stitches per 10 cm, care being taken not to pierce the inner wrapping. If required by the purchaser, the covers shall be packed in suitable wooden boxes having hinge and lock arrangement.

5.2 Each bale or roll shall be legibly and indelibly marked with manufacturer's name and his trade-mark, if any, month and year of packing.

5.2.1 The bales or rolls may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

6. SAMPLING

6.1 Representative samples shall be drawn as prescribed in Appendix C.

APPENDIX A

(*Clause* 4.4.5)

DETERMINATION OF PROOFING CONTENT

A-1. GENERAL

A-1.1 A solvent capable of swelling and dissolving rubber polymer, is required. The choice of suitable solvent depends on the nature of the polymer and on the properties of the textile.

A-2. REAGENT

A-2.1 Solvent — Suitable solvents are chlorinated hydrocarbons, carbon disulphide and higher ketones.

A-3. PROCEDURE

A-3.1 Cut four 10-cm square pieces roughly equally spaced across the width of the fabric with the two outer test pieces centred 15 cm from the selvedges.

A-3.1.1 Condition the test pieces and transfer to weighing bottles and determine the weights taking care to avoid loss of loose fabric. Immerse in the solvent and heat under reflux until the proofing has dissolved or swollen thoroughly (generally about an hour), taking care not to allow the temperature to exceed 160°C. Remove the test piece from the solvent, pull the two fabrics apart and scrape off as much of swollen proofing as possible. Repeat reflux and scraping using fresh solvent until the fabric is free from rubber. Squeeze the fabric to remove the solvent and rinse with light petroleum hydrocarbon solvent. Dry the fabric at 105 to 110°C for 1 hour and condition for 24 hours. Transfer to a weighing bottle and determine the weight. Ash the fabric at a low temperature in a previously ignited and weighed crucible and determine the ash.

A-4. CALCULATION

A-4.1 Weight of proofing, $g/m^2 = 100 (a - b + c)$

where

a = weight in g of test piece,

b = weight in g of fabric after deproofing, and

c = weight in g of ash in the test piece.

APPENDIX B

(*Clauses* 4.5.2, 4.5.4 *and* C-2.3.1)

CONSTRUCTION OF FUMIGATION COVERS

B-1. PREPARATION OF MOSQUITO NET-LIKE STRUCTURE OF THE COVER

B-1.1 The cover shall be made from three panels — one panel to form the top and the two lengthwise side walls, and two smaller panels to form the other two side walls. Make each panel by stitching widthwise number of pieces of double-texture cloth of appropriate length. Pieces shall be joined by means of two rows of stitching as shown in Fig. 1. Ensure that the two rows of stitching are parallel to each other and about 2·5 cm apart. When the panels are ready, join them appropriately edgewise, by stitching, to form the mosquito net-like structure of the cover. Then turn in the bottom edges of the resulting cover, twice to form a hem, the first and second turns being equal to 2·5 cm and 27·5 cm respectively, each turn being secured by a row of stitching. For stitching the joints and hem, use sewing cotton thread 6/36s or other approved thread showing a breaking strength of not less than 2·25 kg. The number of stitches in all cases shall be about 25 to 30 per decimetre.

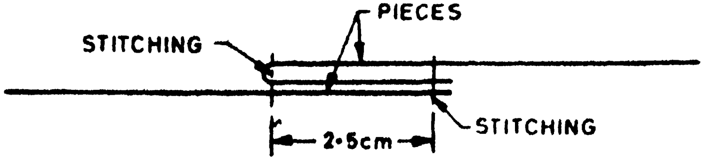

FIG. 1 SECTION OF JOINT

B-1.2 The joints in the side walls of the cover shall be vertical. Care shall be taken to ensure the use of a minimum number of joints in the fabrication of the cover of required size, from fumigation sheet of available width. For example, the following procedure may be adopted for the fabrication of a fumigation cover measuring approximately 8·55 m in length, 6·65 m in width and 5·50 m in height, from rolls of 1 metre wide fumigation sheet:

a) Cut from the rolls of fumigation sheet, 9 pieces in full width of 1 metre, in lengths of 18·25 m. Join them widthwise by stitching, so as to form a panel of 8·55 m width (allowing approximately 5·5 cm for the overlaps at each joint) and 18·25 m (that is, 6·65 m + 5·80 m + 5·80 m) length. Likewise prepare two smaller panels of 5·80 m width and 6·65 m length, from 14 pieces of 1 m width and 5·80 m length, utilizing 7 pieces for each panel.

b) Attach lengthwise by stitching, the two smaller panels, one to each side and at a place equidistant from the ends, of the larger panel. Then join the side edges of the attached smaller panels to the corresponding adjacent free edges of the larger panel to form the mosquito net-like structure of the cover. Make a 27·5-cm wide hem at the bottom edges of the cover as described in **B-1.1** above.

B-2. PROVISION OF OPENINGS AND FUNNELS

B-2.1 Make one or more openings on the top of the cover (as agreed to between the purchaser and the supplier) and funnels for attachment to the openings. If only one opening is required, this shall be located in the central portion of the top of the cover; if two or more openings are required, these shall be equally spaced in a row, in the top portion of the cover, along a line midway between its lengthwise edges. The funnels shall be in the form of cylindrical tubes 7·5 to 10 cm diameter and 23 to 25 cm length and shall be made of two layers of fumigation sheets. The opening or openings shall be circular in shape with a diameter slightly larger than that of the funnel tube.

B-2.1.1 *Method of Fixing of Funnels* — Make three circular pieces of the fumigation sheet. Each piece shall have a diameter of 23 cm, with a central hole of a diameter corresponding to that of the funnel tube. Place two of the circular pieces one over the other, and firmly stitch one end of the funnel tube in between these pieces and in such a way that the tube protrudes through the hole of the upper circular piece. Insert the funnel tube through the opening, from the inside of the cover, bring the upper circular piece in contact with the inner surface of the cover and firmly stitch the two circular pieces to the cover. Place the third circular piece on the outer surface of the cover in such a manner that the funnel tube protrudes through its hole. Securely stitch this piece to the cover and the other two circular pieces. Secure the middle portion of a tying tape to the middle portion of the funnel tube by stitching. The tape shall be 2·5 cm in width and 60 cm in length and shall be attached to the tube in such a manner that its two free ends are equal in length and each has a length of at least 29 cm. The sewing thread used for stitching of the funnel tube, circular discs and tying tape shall conform to the requirements prescribed in **B-1** above.

B-3. FIXING OF HANDLING STRAPS

B-3.1 Secure six handling straps to each of the two lengthwise side walls of the cover by stitching — one at each of the top and bottom corners and one at each of the centres of the top and bottom edges. The straps shall consist of strong webbing of 5 cm width and be of a quality that has been previously approved by the purchaser. Each strap shall have a length of

90 cm and shall be secured by stitching its middle portion to the cover so that the two free ends of the doubled up strap are equal in length and each has a length of at least 35 cm. A brass ring of approved size and quality shall be secured to each of the two free ends of each attached strap.

B-4. SEALING OF THE HOLES FORMED BY STITCHING

B-4.1 To prevent leakage of the fumigant vapour through the holes formed by stitching, seal the seams/joints by the application of rubber adhesive or other suitable sealing material. The sealing material used shall be of approved quality. Ensure that the needle holes are thoroughly sealed and rendered gas-proof.

APPENDIX C

(*Clause* 6.1)

SAMPLING OF FUMIGATION SHEETS AND COVERS

C-1. SAMPLING OF FUMIGATION SHEETS

C-1.1 Lot — In any consignment, all the rolls of fumigation sheets of the same type, colour and finish shall be grouped together and each such group shall constitute a lot.

C-1.1.1 The conformity of the lot to the requirements of the specification shall be ascertained for each lot separately. The number of rolls *n* to be selected from a lot shall depend on the size of the lot *N* and shall be in accordance with Table 2.

TABLE 2 NUMBER OF ROLLS TO BE SELECTED FOR SAMPLING

Lot Size	Number of Rolls to be Selected
N	*n*
Up to 50	2
51 „ 100	3
101 „ 200	4
201 „ 300	5
301 and above	7

C-1.1.2 The rolls shall be selected at random and to ensure the randomness of selection, random number tables shall be used. In case such tables are not available, the following procedure may be adopted subject to agreement between the purchaser and the supplier:

> Arrange all the rolls in the lot in a systematic manner and starting from any roll, count them as 1, 2, 3,............etc, up to *r* and so on, where *r* being the integral part of *N*/*n* (*N* being the lot size and *n* the sample size). Every *r*th roll thus counted shall be withdrawn till the requisite number of rolls is obtained.

C-1.2 Number of Tests

C-1.2.1 From each of the rolls selected according to **C-1.1.2**, one-metre length of fumigation sheet shall be cut, care being taken to exclude not less than 0·25-metre length of fabric from either end. The test specimens necessary for the various tests specified in the standard shall be cut from the lengths of fumigation sheet thus obtained.

C-1.2.2 Tests for determination of all the characteristics specified in the standard, shall be conducted on the test specimens cut from these metre lengths as obtained in **C-1.2.1**.

C-1.3 Criteria for Conformity

C-1.3.1 The lot shall be declared as conforming to the specification if for each of the characteristics the test results on all the individual metre lengths (*see* **C-1.2.1**) are found to be within the limits of the specification.

C-1.3.2 If specimens taken from these lengths fail in one or more tests, each such test shall be repeated twice. For this purpose, two further metre lengths shall be cut from the same roll as the failing metre length and specimens shall be cut from each of them so that duplicate tests may be conducted in respect of each failure. If all the re-tests have passed, the lot shall be declared as conforming to the specification, otherwise not.

C-2. SAMPLING OF FUMIGATION COVERS

C-2.1 Lot — All the fumigation covers produced from essentially similar materials by the same manufacturer shall be grouped together to constitute a lot.

C-2.2 Each lot shall be inspected separately for the requirements of this specification. For this purpose from each lot a number of covers shall be selected at random in accordance with col 1 and 2 of Table 3.

C-2.2.1 The number of covers required in col 2 of Table 3 shall be taken equally from as many bales as possible. The covers to be taken from a bale shall be chosen at random.

AMENDMENT NO. 1 JULY 1984

TO

IS:4810-1968 SPECIFICATION FOR FUMIGATION SHEETS AND COVERS, RUBBERIZED

Addendum

(*Page 13, clause C-2.3.2.2*) - Add the following new clause C-2.3.2.3 after clause C-2.3.2.2

'C-2.3.2.3 If specimens taken from these fumigation covers fail in one or more tests, each such tests shall be repeated twice. For this purpose, two futher metre lengths shall be cut from the same cover as the failing covers and specimen shall be cut from each of them so that duplicate tests may be conducted in case of each failure. If all the retests have passed, the lot shall be declared as conforming to the specification, otherwise not.'

(PCDC 16)

Reprography Unit, BIS, New Delhi, India

TABLE 3 SCALE OF SAMPLING OF STITCHED COVERS

No. of Covers in the Lot	No. of Covers to be Inspected	Permissible No. of Defectives	No. of Covers to be Tested	
(1)	(2)	(3)	(4)	(5)
Up to 50	8	0	0	1
51 ,, 100	13	1	1	2
101 ,, 300	20	2	1	2
301 and over	32	3	1	3

C-2.3 Number of Tests and Criteria for Conformity

C-2.3.1 *Requirements of Construction* — Each one of the covers selected in **C-2.2** shall be inspected for all the requirements specified in **4.5**. A cover failing in one or more of these requirements shall be regarded as defective. The lot shall be considered as conforming to these requirements if the number of defectives in the sample does not exceed the number given in col 3 of Table 3.

C-2.3.2 *Requirements of Fumigation Sheet and Proofing*

C-2.3.2.1 *With raw material tests* — When the raw materials used had satisfied the requirements when tested in accordance with **4.2**, **4.3** and **4.4**, the number of covers to be tested for the requirements of proofing and fumigation sheet given in **4.3** and **4.4** shall be as given in col 4 of Table 3. The lot shall be declared to be in conformity with these requirements if each of these covers satisfies the requirements.

C-2.3.2.2 *Without raw material tests* — When the raw materials used have not been tested, the number of covers to be tested for the requirements of proofing and fumigation sheet given in **4.3** and **4.4** shall be as given in col 5 of Table 3. The lot shall be declared to be in conformity with these requirements if each of these covers satisfies the requirements.

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